Dimensions of the teeth:—

Length of upper	m.3	7·5	millim.
„ „	m.2	12	„
„ „	m.1	11	„
„ „	pm.1	8	„
„ „	pm.2	6	„
„ „	pm.3	5	„
„ „	pm.4 (alveolus only)	4	„
Length of lower	m.3	10	„
„ „	m.2	11	„
„ „	m.1	11	„
„ „	pm.1	8	„
„ „	pm.2	6	„
„ „	pm.3	5	„
Length of upper molar series		31	„
„ lower „	„	34	„

The very close resemblance between the Lower Pliocene and recent species is both remarkable and disappointing, for it might have been expected that in the former some generalized characters would be found that would throw some light on the probable ancestry of this most aberrant mammal; this, however, it has been seen, is not the case.

As Dr. Forsyth Major has pointed out, the former distribution of the genus seems to show that it is of northern origin and that it spread into Africa along with the rest of the Pliocene Mammalia with which it has been found, and was not derived from any southern land-area. Although at present it has been found only at Samos and at Maragha in Western Persia, some twenty degrees farther east, the accompanying mammalian fauna has a much wider range. It has been met with at Concud in Spain, Mt. Leberon in Southern France, Baltavar in Hungary, and Troy in Asia Minor; it probably also ranged far to the east of Maragha, since *Rhinoceros blanfordi*, a species occurring in that locality, is also recorded from Baluchistan and from Southern China, where it is associated with a Giraffe. Although *Orycteropus* has not yet been discovered in these localities, it will probably be found to have ranged far both to the east and west of its limits as at present known.

5. A Contribution to the Knowledge of the Anatomy of *Rhynchops*. By Frank E. Beddard, M.A., F.R.S., Prosector to the Society.

[Received Febuary 4, 1896.]

So far as I am aware the existing knowledge of *Rhynchops* is entirely derived from a paper by Brandt[1] upon its osteology. I found, therefore, with great pleasure a specimen of this genus among the spirit-preserved birds sent home from Western Africa

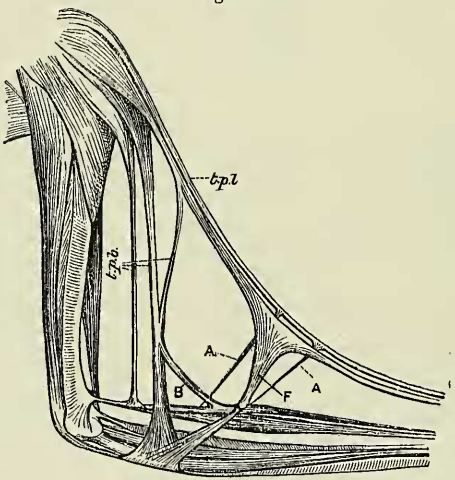
[1] Mém. Acad. Sci. St. Pétersb. sér. 6, Sci. Nat. iii. p. 218 (1840).

by the late W. A. Forbes, upon the dissection of which the following notes are based.

As to external characters, the pterylosis offers no salient point of difference from that of the Gulls as described by Nitzsch. The oil-gland is tufted. There are 12 rectrices. The bird is aquinto-cubital. As regards the alimentary viscera the most important fact to comment upon is the rudimentary and nipple-like character of the cæca.

The *tensores patagii* are illustrated in the drawing exhibited (woodcut, fig. 1). They are exactly like those of *Rissa tridactyla*,

Fig. 1.



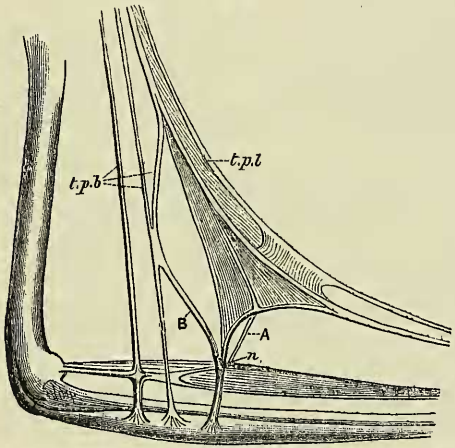
Muscles of the patagium of *Rhynchops*.

t.p.l., tendon of *tensor patagii longus*; *t.p.b.*, *tensor patagii brevis*; B, its wristward slip; F, patagial fan; A, tendinous threads on ulnar side of arm.

of which I possess a drawing by Mr. W. A. Forbes. There are two tendons to the *tensor brevis*, of which the anterior is for the greater part of its length made up of three separate strands. The hinder tendon is much slighter. The anterior tendon gives off a little way from the forearm a wristward slip (fig. 1, B), from which, where it joins the tendon of the extensor radialis metacarpi, a patagial fan (F) arises which joins the *longus*. This fan as well as the main tendon of the *brevis* are continued over to the ulnar side of the forearm as a diffuse glistening tendon. From the point where the wristward slip of the *brevis* springs there is another connection with the *longus*, which is lettered A in the drawing (fig. 1).

Rhynchops shows a peculiar feature of *Larus argentatus* (*cf.* fig. 2) and of most Auks in the existence of these patagial tendons (A) on the ulnar side of the arm. In *Rhynchops* there are two instead of only one of these; they run side by side obliquely, or really at right angles to the *longus* tendon when the wing is extended, and end upon the *extensor metacarpi radialis* muscle, on the inner side of the forearm; the posterior of the two is inserted at a point

Fig. 2.



Patagial tendons of *Larus argentatus* (after a MS. sketch by the late W. A. Forbes).

n, osseous nodule. Other lettering as in fig. 1.

almost exactly corresponding with the insertion of the wristward slip of the *brevis*, though, as already said, on the opposite side of the arm. On the opposite wing I could find only a single tendon; it was, however, very much longer, reaching further over the arm. The *pectoralis* muscle sends a slip to the patagial tendons, which is slightly differentiated from the rest of the *pectoralis* as a muscular belly; there is also a yellowish fibroid slip from the deltoid crest of the humerus.

I could detect *no biceps slip to the patagium* on either wing. I looked, of course, very carefully for this muscle, as it is present in all the immediate allies of *Rhynchops*.

The *biceps* is a very slender muscle which arises from the coracoid only. I found no trace of the missing humeral head. The muscle is divisible into two halves, the division commencing early in the slender tendon of origin. The outer of the two

halves, that which abuts upon the patagium, is chiefly tendon, there being a belly of only about half an inch in length, strung as it were upon a long thin tendon. The inner half of the muscle, on the contrary, is muscular almost to its insertion.

I did not succeed in finding any traces of the *expansor secundariorum*, for which as a characteristic muscle I looked carefully.

The *deltoid* is not extensive. Its humeral attachment occupies rather more than the first third of that bone. It ends exactly on a level with the end of the attachment of the anterior section of the *latissimus dorsi*.

The *anconæus longus*, in addition to the partly fleshy and partly tendinous origin from the coracoid, has a longish and entirely tendinous scapular head; it also is bound down to the humerus by a broad tendon.

In the leg-muscles the most remarkable divergence from the Larine character is in the *total absence of the ambiens* (on both sides of the body).

The *femoro-caudal* is present and has a long tendon of insertion.

The *accessory femoro-caudal* is broader than the latter, is entirely fleshy, and joins it some way before its insertion.

The *semitendinosus* with its *accessory* are present.

There is nothing remarkable about the *biceps* or *semimembranosus*.

There is only one *peroneus*, whose tendon joins that of one of the superficial long flexors.

The *deep flexors* blend entirely about halfway along the metatarsus; the conjoined tendons give off no slip to the small hallux.

§ *Syrinx.*

The syrinx of *Rhynchops* (fig. 3) is a perfectly typical tracheobronchial syrinx with a single pair of intrinsic muscles.

Fig. 3.

Syrinx of *Rhynchops*; lateral view.

The last three or four tracheal rings are closely united, but not fused, to form a box, and there is a well-marked pessulus. The first bronchial semiring, to which the intrinsic muscles are attached, is much longer from back to front, and is arched in the usual way. After this follows a rather deep semiring, which is immediately succeeded by several thinner bars; these latter get deeper towards the opening into the lungs.

§ *General Observations and Classification of the* Laridæ.

In having no ambiens *Rhynchops* is unique among the Laridæ, but not among the Limicolæ in general, if, that is to say, we include, as I think should be done, the Auks in the Limicolæ. In the latter group the ambiens is sometimes present and sometimes absent. The Gull-tribe can be conveniently (even if merely artificially) divided up as follows, *Rhynchops* undoubtedly belonging to a distinct subfamily, not definitely nearer to the Terns than to the Gulls:—

Sterninæ. ABXY+[1]. Cæca nipples. Biceps slip present. Expansor secundariorum absent.

Rhynchopinæ. ABXY—. Cæca nipples. Biceps slip and expansor secundariorum absent.

Larinæ. AXY+. Cæca nipples, biceps slip, and expansor secundariorum present.

Stercorariinæ. AXY+. Cæca long. Biceps slip present. Expansor secundariorum absent.

I should regard *Gygis* as a Gull and *Anous* as a Tern, on account of their leg-muscles; but then *Anous* has the *expansor secundariorum*. These two genera require further investigation before they can be placed; and I am a little suspicious that they may be found to destroy the neatness of the above arrangement.

March 3, 1896.

Sir W. H. Flower, K.C.B., LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of February 1896:—

The total number of registered additions to the Society's Menagerie during the month of February was 50, of which 20 were by presentation, 2 by birth, 17 by purchase, 2 in exchange, and 9 were received on deposit. The total number of departures during the same period by death and removals was 79.

The following additions are of special interest:—

1. A young male Klipspringer Antelope (*Oreotragus saltator*), presented by Commander Alfred Paget, R.N., H.M.S. 'Dolphin,' Port Said.

[1] AXY+ in a species of *Sternula* (Forbes, MS.).

Capt. Paget informs me that this animal was captured in the Khor Abent, halfway between Suakin and Cassala. It is new to the Collection.

2. A Hybrid Antelope, bred between the male of *Tragelaphus gratus* (received from the Hamburg Gardens, July 27, 1894) and a female *Tragelaphus spekii*, presented by James A. Nicholls, Esq., F.Z.S., Oct. 14, 1890.

This curious hybrid in general appearance appears to take after the rufous colour of the female of *T. gratus*. It has a black dorsal stripe and is spotted on the flanks. So far as we can tell, the period of gestation in this instance was about seven months.

Mr. G. E. H. Barrett-Hamilton, F.Z.S., exhibited several fresh-looking skeletons of the Norway Lemming (*Myodes lemmus*), obtained by Dr. H. Gadow in caves near Athouguia, in Portugal, and made the following remarks:—

Early in the year 1895 Dr. H. Gadow handed me for examination some skeletal remains of a species of small mammal, which, on a first inspection, appeared to be those of some species of Vole—*Microtus*. Thinking the remains were those of Voles I put them aside for a time, but later on, when I had an opportunity of examining them more carefully, I found, to my surprise, that they consisted of some skeletons and detached bones of the Norway Lemming, *Myodes lemmus*. When first received by me the remains consisted of a good many fragments and single bones, and of two almost complete skeletons. These latter were completely enveloped in the original skin, which had become so dried and hardened that in order to enable myself to examine the skeletons I had to get it removed. The whole appearance of the specimens was so fresh that, unaware as I was of their true character, I had the dried skin, which enveloped them like mummies, removed, so that, I regret to say, not one of these most interesting specimens has been preserved in the condition in which I received it. Some of the vertebræ, however, are still connected together by the dried remains of the ligaments. This, and the whiteness and excellent preservation of the bones, will show how easy it was to be deceived as to their nature, and to come to the belief that they were of recent origin and perhaps unimportant.

This discovery of Dr. Gadow's is of very great interest, as it enormously increases our knowledge of the distribution of the Norway Lemming in past times, and helps to throw light upon the former climatic conditions of Portugal.

According to Professor R. Collett[1], the most recent authority on the Norway Lemming, this animal has its principal home in Norway, where it inhabits all the mountain plateau from north to south of the country, and in some localities is distributed down to the sea-level. Its range includes also Swedish and Russian Lapland, but ceases eastward on the western shores of the White Sea, and, though the animal is spread over the greater part of the

[1] '*Myodes lemmus*, its Habits and Migrations in Norway.' Christiania, 1895.

Kola Peninsula, it does not seem to habitually appear so far eastward as Archangel. Thus the present southern range of the animal does not extend below about 58½° North latitude. We know, however, that in recent geological times it had a much more southern distribution, extending at least as far as the south of England and Saxony, since its remains have been found in the Somersetshire caves, six lower jaws from which, now in the Taunton Museum, were identified by Sandford[1]. These bones are said to be slightly smaller and to have the condyles more slender than those of recent specimens, but to agree very closely with them, especially with the skulls of young animals[2]. The only other locality where, so far as I am aware, the bones of this species have been found is at Quedlinburg, in Saxony, where Hensel[3] found it, together with *M. torquatus*, in 1855, among fossils from the diluvium. The present discovery will therefore show that the range of the Norway Lemming extended formerly to at least nearly the south of the Iberian Peninsula, and that, too, judging from the fresh appearance of the remains, in quite recent geological times.

The present skulls resemble those of recent Lemmings very closely indeed, but, like the specimens found in the Somersetshire caves, they are smaller than those of large adult recent animals. I cannot, however, find any characters sufficiently important to enable me to separate the two specifically.

In conclusion, I should like to draw attention to the following statement, which is to be found on pages 147 and 148 of Messrs. Abel Chapman and W. J. Buck's work on 'Wild Spain' (chapter xii.). Writing of Ibex-shooting in the Sierra de Grédos of Old Castile, these authors remark:—"One day, close to the snow-line, we came across a fat, blue-grey, little beastie, apparently of the Dormouse tribe (*Liron*, in Spanish), but he got to earth, or rather rock, ere we could capture him." This description is too vague to enable me to do more than to make a suggestion, and the suggestion that Lemmings exist in Spain at the present day is too startling to be lightly brought forward; but I should like to point out that the description would apply very well to *Myodes schisticolor*—a species which (if it really be a good species) is, I believe, only distinguishable from *M. lemmus* by its bluish-grey colour.

At all events, in view of Dr. Gadow's remarkable discovery of fresh-looking Lemming bones on comparatively low ground, it would be interesting to know what is the true nature of the "fat, blue-grey, little beastie"; and I venture to express a hope that this animal will be found to be a Lemming or a Vole, and

[1] W. A. Sandford, in Quart. Journ. Geol. Soc. vol. xxvi. (1870), p. 125, pl. viii. fig. 3; and Dove, Somerset. Nat. Hist. Soc. vol. xv. (1870), p. 55.

[2] H. P. Blackmore and E. R. Aston, in P. Z. S. 1874, pp. 460–471.

[3] Zeitschr. deutsch. geol. Gesell. vii. (1855), pp. 458–501; also at Wolfenbüttel, A. Nehring in Zeitschr. für ges. Naturwis. Bd. xlv. p. 1 (1875), and in Kent, E. T. Newton, Geol. Mag. 1890, p. 452, and Quart. Journ. Geol. Soc. vol. l. p. 188 (1894).